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Ophthalmic optics — Contact lenses and contact lens care products — Labelling

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Optique ophtalmique — Lentilles de contact et produits d'entretien des lentilles de contact — Étiquetage
AMENDEMENT 1

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This document was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 7, *Ophthalmic optics and instruments*.

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Ophthalmic optics — Contact lenses and contact lens care products — Labelling

AMENDMENT 1

4.1, third paragraph

Replace the third paragraph with the following:

"All written information and symbols intended for the user shall be designed to have a minimum height of 0,7 mm for black text or black symbol on a white background. All other colour combinations shall be designed with a minimum height of 0,7 mm and a contrast of at least 3:1 between the colour of the text or symbol and the colour of the background as computed using the colours' red, green, and blue (RGB) values.

Convert cyan, magenta, yellow and black (CMYK) printed colour values to RGB values using a conversion tool.

NOTE See Annex A for information on and examples for the calculation of contrast between text or symbol and background. Online calculators exist to compute contrast based on RGB values."

Annex A

Add a new Annex A as follows:

Annex A
(informative)

Calculation of contrast between text or symbol and background

A.1 General

This annex provides guidance on calculating contrast between text or symbol and background based on the colour of both the text or symbol and the background.

A.2 Principle

A.2.1 RGB colour space model

The RGB colour space basis is the three colours red, green, and blue. The colour space model utilizes intensity values for each colour to describe a gamut of colours. The gamut is created by adding varying amounts of red, green, and blue. The amounts vary from 0, black, to a set value for the maximum intensity and fully saturated colour. A common scheme is to use 8 bits, the integer values from 0 to 255, to specify the amount of red, green, and blue.

A.2.2 sRGB colour space model

The standard RGB (sRGB) colour space is a device-independent model. The model uses the same colourimetric RGB definitions as the RGB colour space, but further specifies display and reference conditions.

A.3 Computing contrast

A.3.1 General

In the sRGB colour space model with 8-bit values for each colour ranging from 0 to 255, the transformation from RGB 8-bit to sRGB is nonlinear:

$$R'_{sRGB} = R_{8bit}/255$$
$$G'_{sRGB} = G_{8bit}/255 \quad \text{(A.1)}$$
$$B'_{sRGB} = B_{8bit}/255$$

If $R'_{sRGB} \leq 0{,}040\,45$ then $R_{sRGB} = R'_{sRGB}/12{,}92$
else $R_{sRGB} = [(R'_{sRGB} + 0{,}055)/1{,}055]\text{^}2{,}4$
If $G'_{sRGB} \leq 0{,}040\,45$ then $G_{sRGB} = G'_{sRGB}/12{,}92$ (A.2)
else $G_{sRGB} = [(G'_{sRGB} + 0{,}055)/1{,}055]\text{^}2{,}4$
If $B'_{sRGB} \leq 0{,}040\,45$ then $B_{sRGB} = B'_{sRGB}/12{,}92$
else $B_{sRGB} = [(B'_{sRGB} + 0{,}055)/1{,}055]\text{^}2{,}4$

The relative luminance (L) from IEC 61966-2-1 for a given colour in the sRGB colour space model is:

$$L = 0{,}2126R_{\text{sRGB}} + 0{,}7152G_{\text{sRGB}} + 0{,}0722B_{\text{sRGB}} \tag{A.3}$$

NOTE The term "luminance" in this use represents the Y tristimulus value from CIE 1931 as stated in IEC 61966-2-1.

The contrast between the text or symbol and the background is:

If $L_{\text{test}} > L_{\text{background}}$ then

$$Contrast = \frac{(L_{\text{text}} + 0{,}05)}{(L_{\text{background}} + 0{,}05)} \tag{A.4}$$

Or if $L_{\text{background}} > L_{\text{text}}$ then

$$Contrast = \frac{(L_{\text{background}} + 0{,}05)}{(L_{\text{text}} + 0{,}05)} \tag{A.5}$$

Note that for the given definitions, contrast will always be greater than 1, and is typically written as a ratio of Contrast:1. Black text or black symbol on a white background has a contrast of 21:1, which is the maximum.

A.3.2 Example of text and background colours with acceptable contrast

Starting with descriptions of colour in the RGB 8-bit colour space, assume text that is a shade of orange (R = 255, G = 144, B = 51) on a background that is a shade of blue (R = 4, G = 16, B = 240).

The computed contrast between text and background is 3,974:1. This is an example of an acceptable combination of text and background colours since the contrast is greater than 3:1.

The computed values leading to contrast are given in Table A.1 and Table A.2.

Table A.1 — Example text and background colour values in RGB 8-bit and sRGB colour space models

Parameter	RGB 8-bit	sR'G'B'	sRGB
Text			
R	255	1,0000	1,0000
G	144	0,5647	0,2789
B	51	0,2000	0,0331
Background			
R	4	0,0157	0,0012
G	16	0,0627	0,0052
B	240	0,9412	0,8714

Table A.2 — Luminance and contrast for example text and background colours in Table A.1

Parameter	Luminance	Contrast
Text	0,4145	—
Background	0,0669	—
Contrast	—	3,974

A.3.3 Example of text and background colours with unacceptable contrast

Starting with descriptions of colour in the RGB 8-bit colour space, assume text that is a shade of greenish-blue (R = 0, G = 152, B = 175) on a background that is a shade of orange (R = 255, G = 215, B = 130).

The computed contrast between text and background is 2,495:1. This is an example of an unacceptable combination of text and background colours since the contrast is less than 3:1.

The computed values leading to contrast are given in Table A.3 and Table A.4.

Table A.3 — Example text and background colour values in RGB 8-bit and sRGB colour space models

Parameter	RGB 8-bit	sR'G'B'	sRGB
Text			
R	0	0,0000	0,0000
G	152	0,5961	0,3140
B	175	0,6863	0,4287
Background			
R	255	1,0000	1,0000
G	215	0,8431	0,6795
B	120	0,4706	0,1878

Table A.4 — Luminance and contrast for example text and background colours in Table A.3

Parameter	Luminance	Contrast
Text	0,2555	—
Background	0,7122	—
Contrast		2,495

Bibliography

Add the following references to the Bibliography:

[3] IEC 61966-2-1, *Multimedia systems and equipment — Colour measurement and management — Part 2-1: Colour management — Default RGB colour space — sRGB*

[4] W3C. 2018. Web Content Accessibility Guidelines (WCAG) 2.1. [online]. 2018. [Accessed 28 December 2018]. Available from: http://www.w3.org/TR/WCAG21/

[5] CIE 1931: *International Commission on Illumination: Color Spaces*

[6] DeCusatis, C. [ed], Handbook of Applied Photometry. AIP Press, 1997

[7] Marucco, Stoddard, Ferenbach & Walsh, Inc. Color Contrast Ratio Calculator. [online]. [Accessed 28 December 2018]. Available from: http://www.msfw.com/Services/ContrastRatioCalculator